ELECTRONICS TECHNICIAN GS-0856-09

GROUND ELECTRONICS MAINTENANCE

ELECTRONIC TECHNICIAN GS-856-

INTRODUCTION

This position is located in the Air Operations Department, Ground Electronics Maintenance Division, Naval Air Station, Lemoore, California. The purpose of this position is to ensure that the operational specifications of the complex integrated air navigational/ radar systems and associated ancillary equipment utilized for Air Traffic Control are maintained. These systems are used to ensure safety of flight and provide required training for military pilots prior to deployment. The purpose of this position is to provide operation, maintenance and training for systems to the component level.

MAJOR DUTIES

Performs technical duties on more than one of the most complex navigational/integrated radar systems. Typical of these systems are the AN/GPN-27 Air Search Radar System which is composed of two channels, four major systems, and 25 integrated subsystems contained in three locations separated by two miles, and the AN/TPX-42(V)10 Identification Friend or Foe Radar System composed of two remote radar interrogation transmitters with twenty two integrated subsystems allowing both radars to be displayed simultaneously.

---- Analysis, verifies, tests, plans, and maintains system operational performance requirements for Air Traffic Control use in flight safety and pilot training. ~~The incumbent is required to maintain qualification on assigned equipments to be able to certify their safe usage by Air Traffic Control personnel.~~ The incumbent makes functional pre-flight tests and interface checks interrupting and applying a broad range of technical data to ensure equipment performance. The incumbent will evaluate the operational characteristics of integrated systems by observing and analyzing waveforms, voltage/current/power indications, computer registers or printouts, chart recorder readings, instrument readings and review and analyze this data to determine if the systems are operating within allowable specifications.

5% ---- The incumbent will diagnose operational malfunctions and determine the methods for effective repair. Due to the numerous interlinked units, subsystems, and control circuits, interacting relationships exist making repair of the systems extremely complex.

5% ---- Provides and conducts on-the-job training for both maintenance and Air Traffic Control personnel in all phases of operation, repair, alignments, overhaul, modifications, testing, and troubleshooting.

.5% ---- Provides documentation to technicians of higher grades, program officials, and contractors. Is responsible for technical accuracy in compliance with OPNAVINST 4790.4(), NASLINST 4790.2(), and certification procedures.

---- Maintains parts inventory and records on systems. Searches supply catalogs and orders replacement items as required. Accuracy of supply documentation is required due to high dollar value of items ordered. Most exceed $1,000.00 and several exceed $14,000.00.

---- Researches the available technical documentation to aid in repair, overhaul, rebuilding, modification, testing and troubleshooting. Submits changes to documentation as errors are discovered.

---- Performs other related tasks as assigned by the supervisor.

(1) KNOWLEDGE REQUIRED BY THE POSITION

---- A professional knowledge of the relationship between closely integrated high density electronic systems to do the analysis, verification and testing on more than one most complex system.

---- Theories and practices of radar propagation and microwave principles, computer theory and application, computer programming, power systems, mathematics, engineering mechanics, maintenance and design characteristics associated with systems of the most complex to maintain the accuracy of system performance.

---- Skill in utilizing schematics, diagrams, flow charts, wiring diagrams, mathematical expressions and formulas to diagnose complex integrated system problems.

---- Comprehensive knowledge of material management and logistics to support the maintenance requirements of Air Traffic Control radar/ navaids, and other associated systems.

---- Comprehensive knowledge of electronic safety methods to facilitate safe electronic system troubleshooting.

---- Skills in training techniques to ensure a comprehensive training program on systems for both the maintenance technicians and Air Traffic Controllers.

---- Skills in evaluating and interrupting chart recordings, instrument readings, computer working, and teletype data to analyze computer malfunction, ground control malfunctions, and/or aircraft problems.

---- Skill in the use of electronic test equipment consisting of: dual trace oscilloscope, dual trace storage oscilloscope, spectrum analyzer, digital multimeters, analog multimeter, R.M.S. voltmeters, digital frequency counters, signal generators, audio oscillators, frequency synthesizers, power meters, power supplies, time domain reflectometers, meggers, sweep generators, deviation meters, and specialized test equipment to aid in performing diagnostics, troubleshooting, and repair.

---- Employment is predicted on the incumbents ability to obtain and maintain 3-M qualifications in accordance with OPNAVINST 4790.4() and NASLEMINST 4790.2() as well as system certification in accordance with NAVAIR 00-80T-114.

---- Work requires employee to drive a vehicle. A valid state drivers license is required.

---- Requires a CONFIDENTIAL Security Clearance.

(2) SUPERVISORY CONTROLS

---- Works under the ~~supervision~~ direction of the ~~Leading Chief Petty~~ Ground Electronics Maintenance Officer, who makes assignments in terms of objectives and resources available.

---- The technician uses his own self initiative, judgment, and expertise to plan and perform the work required. The technician is responsible for providing technical guidance to other civilian employees and military personnel. Technician reports to the supervisor on equipment status and requirements to resolve problems. Preventive maintenance is spot checked by the supervisor in accordance with OPNAVINST 4790.4(). Corrective maintenance is reviewed in terms of the effectiveness and accuracy of incumbents decisions.

(3) GUIDELINES

---- Technical information is available; but it is often in error, vague, or incomplete when utilized to diagnose unique problems. This requires the incumbent to improvise methods based on personal experience, knowledge, and expertise to resolve problems and maintain equipments. Reports to higher authority through the chain of command any major discrepancy in documentation.

(4) COMPLEXITY

---- Work involves providing all phases of maintenance for the most complex electronic systems utilized for air traffic control and the associated training of operators and maintenance technicians. Incumbent considers such factors as interrelation of complex systems and subsystems. Requirements are to maintain equipment to certification standards with no deviation by verifying, interpreting, and analyzing operational conditions from data gathered from a variety of sources. Training provides a direct impact on subsequent equipment repair, performance and availability of these systems for use.

(5) SCOPE AND EFFECT

---- Responsible for maintaining the accuracy and readiness of equipments to provide maximum system availability for Air Traffic Control operations and Pilot/ Air Traffic Controller training.

---- The direct protection of life and property on the station and in the surrounding community hinges upon the accuracy and reliability of systems checkout and operation.

(6) PERSONAL CONTACTS

---- Contacts are with GEMD personnel, air traffic control personnel, squadron pilots, and other station departments including Public Works, Aircraft Intermediate Maintenance Department, Fire Department, Supply, Ground Safety and Meteorology. Contacts off station include pilots, contractors, NAVELEX field maintenance authority, and technicians at other air stations, certification personnel, and fleet personnel.

(7) PURPOSE OF THE CONTACTS

---- Contacts are for the purpose of providing and exchanging information of historical details, potential problems, and resolutions to problems. Contacts with off station activities help to ensure all requirements both on and off station are met.

(8) PHYSICAL DEMANDS

---- The work involves prolonged periods of standing, bending, climbing, lifting and carrying under stipulations of NAVOSH guidelines. Often work is performed in cramped quarters. Occasionally performs assignments under stressful conditions predicted by safety of flight requirements. Must be able to distinguish colors and shades of colors.

(9) WORK ENVIRONMENT

---- Works in shop or remote area. Work is sometimes performed under stressful conditions due to inclement weather and the flight environment. While on flight line, is exposed to sever levels of noise pollution and excessive heat during summer months. Is in a high risk situation during arriving and departing aircraft. Frequently exposed to possible cuts, bruises, scrapes, and serious burns from electrical shock. Employee must use caution and all necessary measures applicable to OSHA guidelines for safety problems. Utilizes hazardous material under controlled environment. Shift work and extended working hours may be required.

Medical surveillance: Hearing Conservation.

Complex Systems. Complex systems are those which require the highest technical skills and knowledges in analyzing, testing, diagnosing and correcting defects or ensuring continuous and reliable operation. The Explanation of Evaluation Plan in the CSC 1962 single agency standard cited a method of measurement of the complexity of a system based on level and variety of skills and knowledges required in its maintenance. That measurement is applicable to the electronic systems in the facilities covered by this guide, i.e., the higher level and greater variety of knowledges are associated with systems having numerous features and interrelated functions as evidenced by the differences between the Very High Frequency Omnitest System (VOT) and the Instrument Landing System, (ILS), or the Airport Surface Detection Equipment (ASDE) radar system and the long range radar.

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Work Assignments

The GS-9 technician will have attained an experience level where he can normally be assigned the analysis, repair and evaluation of a subsystem or equivalent level within a complex electronic system. He is considered sufficiently proficient to do productive maintenance work and will be given specific assignments.

Nature of Work

These GS-9 electronic technicians work in high density locations which are associated with large numbers of complex electronic systems. Typical duty assignments encompass analyzing, repairing and evaluating a subsystem of higher order systems in [illegible] Especially important to the GS-9 electronics technician in these

work situations is the understanding of how the equipment interfaces with other equipment and other facilities.

Skills and Knowledges

This technician is required to develop skills and knowledges that enable him to perform his technical analysis and corrective procedures within extremely short deadlines or minimum time periods.

Supervision

Technicians at this level normally work independently during the progress of maintenance work on a subsystem. Upon completion, the supervisor or higher grade technician spot checks critical features of subsystems to insure that preventive or corrective maintenance has been properly performed. While working on full systems, work is checked in progress and upon completion for technical accuracy, and conformance with established maintenance procedures and policies.

ELECTRONICS TECHNICIAN GS-856-11

Work Assignments

A technician of this level will have assignments in work situations that may vary by location. Typically, at locations having large accumulations of equipment, he will work with higher grade technicians and is assigned the analysis, repair, maintenance and certification of a number of subsystems within one or more of the complex systems in a specialization. In other situations, he will be assigned [illegible] for one complex system as his primary work plus secondary duties, if necessary, to complete

a man-year workload.

Because of their critical relationships to the operation of an Air Route Traffic Control Center, for purposes of this guide, the Remote Center Air Ground (RCAG) facility and the Radar Microwave Link Repeater (RMLR) facility are considered within the scope of GS-11 level work. Assignment of either, plus additional work if needed to complete a man-year workload, will satisfy the above criteria.

Nature of Work

The technicians at this level, while performing less complex work, are under the same working pressures as those imposed on the higher grade employees. Their work is performed in high level traffic locations and the requirements for rapid equipment restoration is always paramount.

Their work involves maintenance on a number of types of electronic systems and the assumption of operational responsibility for large segments of these systems or responsibility for one complex system and additional work. In either case, their responsibility includes certification by official log entries that the subsystem or system is working within the prescribed electronic parameters or tolerances established for its operational use.

Technicians at this level are involved in maintenance of electronic equipment which includes a mixture of vacuum tube and solid state circuitry and a mixture resulting from the purchase of similar equipment from different manufacturers. Such mixtures require skills and knowledges in many facets of electronics and the ability to recognize and resolve equipment problems peculiar to these differences.

Skills and Knowledges

Work at this level requires both theoretical and operational knowledge of the equipment assigned. This has been acquired through either formal classroom training furnished by FAA or equivalent training and experience. In either case, this level employee characteristically has an in-depth knowledge of the electronic operation of major parts of the equipment and the theoretical background to guarantee its efficient operation and a high level of availability.

Additional Work Requirements

While the primary work of an FAA technician is the maintenance of electronic equipment, his assignments typically include other work significant to the total operation of a facility. At this level, the technician assists higher level technicians in installation of equipment modifications originating from Washington headquarters, regional offices and from manufacturers. A GS-11 level technician will be assigned less complex modifications and in areas where these are being tested, he is expected to evaluate and make recommendations on the validity of the modification. The GS-11 technician may be called upon to assist in formalized inspection and evaluation of facilities, and is involved in assisting with flight checks.

Supervision

The technician at this level performs his assignments independently and typically has his work checked only upon completion or by the evident satisfactory operation of the equipment. He obtains assistance, when needed on the most complex problems, from higher grade technicians or super-

visory staff. He is expected, however, to demonstrate full competence within the range of his assignments and to develop his own approach in resolving problems.

ELECTRONICS TECHNICIAN GS-856-12

Work Assignments

Technicians at this level perform the most complex electronic maintenance work found at a facility and as a group provide the highly skilled talent required to maintain the continuous operation of equipment that is basic to the safety and efficiency of air transportation. Their work will involve investigating, analyzing, testing, diagnosing, correcting and tuning the most complex electronic equipment to restore or ensure continuous and reliable operation. Work assignments will normally include full maintenance certification responsibility for two or more complex systems.

The GS-12 technician has a skill and knowledge background that enables him to assume any type of assignment and certify upon its completion that the equipment involved is safe for operational use by the flying public. His range of maintenance work will include the most intricate integrated circuits; and in some specializations, he must have an in-depth knowledge of various kinds of logic used by different manufacturers and be able to trace problems from equipment using one type through equipment using an altogether different logic. In other cases, a number of the same systems at a facility may be made by different manufacturers and the technicians at this level will have the technical ability to diagnose problems in a variety of circuit and component configurations.

Nature of Work

A technician at this level assumes system certification responsibility for the several systems assigned. This

is tantamount to an agency certification to the flying public that the system is operable for use in the safe and expeditious flow of air traffic. In 24 hour work situations, the GS-12 technician assumes a watch or shift responsibility for all of the assigned equipment. This may involve several systems in one specialization or in two different electronic specializations.

The demands for high priority restoration of all systems are typical of the work environment of the GS-12 level. A number of sources may call upon him to provide restoration in the shortest period of time. This demand is present regardless of whether the system is dualized since the equipment is generally required to be available for service at all times.

The demands for restoration, regardless of origin, are placed directly on the technician. In all cases, the technician's work is performed with the awareness that an extended outage may result in aircraft delays, and that such delays may require the imposition of flow control of aircraft between major terminals. The latter procedures involve spacing the departure of aircraft to prevent long periods of flying in holding patterns over a destination terminal.

A technician at this level spends a substantial amount of time on corrective maintenance resolving the more difficult electronic problems. These are not only characterized by the requirements for an in-depth theoretical knowledge in their resolution but also the ability to trace such problems through interfacing equipments. In most facilities, the work of this level technician is not on a single system but a series of interfacing systems or large complex of interfacing equipment and the most difficult work at times is determining in which systems or equipment the fault has

occurred. This requires the ability to analyze a problem involving numerous circuits in the shortest possible time and in equipment which may be functioning in a live traffic control situation.

Skills and Knowledges

The skills and knowledges of the GS-12 technician are normally the accumulated product of numerous hours of formal training offered by FAA in the course of his career. Beyond this, however, this level technician is characteristically selected for additional long periods of specialized training on the maintenance of the newest and more complex electronic systems. In any case, his skill and knowledge level is representative of the highest technical training available.

The level of technical knowledge offered in the training course(s) includes not only the functional operation of specialized electronic equipment but also the design theory of operation. The accumulated theoretical knowledge of this level technician provides him with the ability to cope independently with the most complex problems whether within a system or those involving several systems.

This level technician normally has been given personal certification authority on a number of electronic systems in one or more specializations. These represent passing full written examinations and actual demonstrations of technical skill in analyzing and correcting faults in each system.

Additional Work Requirements

At this level, the technician is normally expected to carry out supplementary assignments that improve the performance of the systems assigned. Such work would include the installation of equipment modifications provided by regional or Washington headquarters.

Following such installation, the technician may be required to prepare performance reports on the worth of the modification and, if in a test situation, his recommendation as to whether the modification is acceptable for national use.

On occasion, he may be required to evaluate equipment performance and submit to superiors either written or oral reports on long term trends. He is expected to submit his own recommendations on resolving any long term problems that arise.

Supervision

This level technician is expected to perform his assignments with a minimum of technical supervision and assistance. He is considered a technical expert in the area of his assignment and normally only those problems requiring equipment or circuit redesign would be referred to higher level. The GS-12 technician makes his own decisions and judgments on the resolution of problems and is expected to report to his supervisor only the existence of problems and their resolution. The continuous and reliable operation of the systems assigned are generally accepted by supervisory levels as evidence of the satisfactory performance of his work.